Occupational Safety Competency 1.11

Competency 1.11 **Occupational safety personnel shall demonstrate familiarity with the application of basic and applied sciences to safety considerations.**

1. Supporting Knowledge and Skills

a. Discuss the role of mathematical tools (including algebra, trigonometry, calculus, statistics, and symbolic logic) in the safety field in analyzing quantities, magnitudes, an forms and their relationships and attributes.

b. Discuss the laws of physics associated with mechanics, heat, light, sound, electricity, magnetism, and radiation and the application of these laws in the safety field.

c. Discuss basic chemistry concepts including atomic structure, bonding, states of matter, chemical energetics and equilibrium, and chemical kinetics.

d. Discuss the biological sciences including heredity, diversity, reproduction, development, structure, and function of the cells, organisms, and populations, with emphasis on human biology.

e. Discuss behavioral sciences including such considerations as individual differences, attitudes, learning, perception, and group behavior and the application of these considerations to the safety field.

f. Discuss the general engineering and technology disciplines including applied mechanics, properties of materials, electrical circuits and machines, principles of engineering design and drawings, and computer science.

2. Self-Study Activities (corresponding to the intent of the above competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	**Site Location**	**Notes**
Department of Energy	http://wastenot.inel.gov/cted/stdguido.html	DOE Standards, Guides, and Orders
OSHA	http://www.osha-slc.gov/	OSHA documents and search engine
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Due to the scope of the subject matter, a review of the listed material is suggested. If the candidate needs more in-depth study, the handbook series each contain several exercises in particular subject areas.

Review DOE-HDBK-1014-92, *Fundamentals Handbook*, "Mathematics," Volumes 1 and 2.

Review DOE-HDBK-110-92, *Fundamentals Handbook*, "Classical Physics."

Review DOE-HDBK-1015-93, *Fundamentals Handbook*, "Chemistry," Volumes 1 and 2.

Review *Fundamentals of Industrial Hygiene*, 3rd Edition, National Safety Council, 1988 (Parts 1 & 2).

Review *Industrial Toxicology, Safety, and Health Applications in the Workplace*, edited by Phillip L. Williams and James L. Burson, Van Nostrand Reinhold, New York, 1985.

Review DOE *Guide to Good Practices for Teamwork Training and Diagnostic Skills Development*.

Review DOE-HDBK-1016-93, *Fundamentals Handbook*, "Engineering Symbology," Prints, and Drawings.

Review DOE-HDBK-1017-93, *Fundamentals Handbook*, "Material Science," Volumes 1 & 2.

Review DOE-HDBK-1018-93, *Fundamentals Handbook*, “Mechanical Science,” Volumes 1 & 2.

Review DOE-HDBK-1012-93, *Fundamentals Handbook*, “Thermodynamics, Heat Transfer, and Fluid Flow,” Volumes 1-3.

Review DOE-HDBK-1011-93, *Fundamentals Handbook*, “Electrical Science,” Volumes 1-4.

3. Summary

None.

4. Exercise Solutions

See the above listed handbooks.